DOCUMENT RESUME

ED 023 485 PS 001 310

By-Feld, Sheila; Lewis, Judith
Further Evidence on the Stability of the Factor Structure of the Test Anxiety Scale for Schildren.
National Inst. of Mental Health (DHEW), Bethesda, Md.
Pub Date Feb 67
Note-35p.
EDRS Price MF-$0.25 HC-$1.85
Descriptors-*Anxiety, Elementary School Students, *Evaluation, Factor Analysis, *Factor Structure, Grade 2, Measurement Instruments, *Psychological Tests, Test Reliability, *Test Validity
Identifiers-TASC, *Test Anxiety Scale For Children

In a 1963 experiment, 3867 boys and 3684 girls in the second grade were used to investigate the dimensionality of the Test Anxiety Scale for Children (TASC). Factors included test anxiety, remote school concern, poor self-evaluation and somatic signs of anxiety. Factor analysis demonstrates a stable multidimensional structure for TASC. Results indicate independent dimensions are required. While the questions comprising TASC admit a full range of anxiety reactions, the test is limited to academic evaluation. Additional analyses of anxiety could include comparisons to situations occurring outside of school The second grade data indicate that the stimulus class in TASC needs delimiting by distinguishing between formal test and other school evaluation situations and that there is more than one mode of anxiety response to school evaluation situations. To understand the nature of components of anxiety, measures of anxiety to test and affiliative situations could be included in a single factor analysis. A sampling of all stimuli and responses would define their independent and interactive effects on anxiety. While TASC scores and school achievement measures differ, later research will determine if this is caused by only some dimensions underlying responses to TASC. After explorations, TASC should be expanded so that several dimensions have adequate item coverage. (DO)

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FURTHER EVIDENCE ON THE STABILITY OF THE FACTOR STRUCTURE OF THE TEST ANXIETY SCALE FOR CHILDREN

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PS001310

ED023485

Laboratory Paper Number 17
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Sheila Feld and Judith Lewis

Mental Health Study Center

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Abstract

Dimensionality of the Test Anxiety Scale for Children (TASC) was investigated for 3867 boys and 3684 girls in the second grade. Principal component factor analyses and orthogonal rotations were performed for each sex. Rotated factor matrices were compared to each other and to factor matrices obtained by Dunn for children at two older age levels. For second graders, four factors were interpreted: Test Anxiety, Remote School Concern, Poor Self-Evaluation, and Somatic Signs of Anxiety. Test Anxiety was the largest factor for both sexes. Factor structures for second grade boys and girls were highly comparable and showed marked similarity to Dunn's samples. It was concluded that the TASC has comparable multidimensional structure across sex and age groupings.

The purpose of this study was to investigate the dimensionality of the Test Anxiety Scale for Children (TASC) developed by Sarason and his colleagues (Sarason, Davidson, Lighthall, & Waite, 1960). The scale has been scored as if it were unidimensional in nature although Sarason et al. (1960) explicitly attempted to include several dimensions of Freud's anxiety concept in the construction of their questions. Dunn (1964, 1965) has already demonstrated through factor analytic techniques that the TASC is not unidimensional when respondents are children in grades four through nine, and similar multidimensional results have been obtained with mentally retarded children (Silverstein & Mohan, 1964). The present issue is to determine whether similar numbers and types of dimensions underlie the responses of younger children. In another phase of the study, the dimensions obtained will be the bases for further investigation of possible differential determinants and consequences of the various types of anxiety tapped by the TASC.

The present paper presents the results of a factor analytic investigation of the TASC as responded to by second grade boys and girls. The analyses are directed toward: (a) comparisons of the similarity in number and content of dimensions for both sexes at this age level, and (b) comparisons of the similarity in number and content of dimensions for our subjects and for the older children studied by Dunn.

Method

Subjects

The total sample included all those children ($\underline{N}$ = 8875) enrolled in the second grade of a county public school system on the day that the testing was done at their particular school. The county is adjacent to

a major northeastern metropolitan center and is one of the most rapidly growing counties in the United States. Although there is wide diversity in its population, it has a socioeconomic base that is higher than the national average. The occupational distribution of the county population differs from the national average largely in the overrepresentation of professional and skilled manual workers and the underrepresentation of semiskilled and unskilled workers.

All testing was done during a two-month period in the winter of 1963. Not all children in the total sample were administered the TASC: 702 (7.9%) of the children were absent on the day of the testing, and 233 children (2.6%) did not participate because their parents refused permission for them to do so. Of the remaining 7940 tested children, 389 (4.3%) were not used in the present analyses because of omitted answers to several questions. These attritions from the total sample left maximum samples of 3867 boys and 3684 girls for use in the factor analyses. Since some of these Ss omitted answers to one of the questions, the actual N for any correlation varied slightly from this figure.

Future procedures will provide detailed comparisons of the factor analysis Ss and the various types of excluded Ss in terms of their family background characteristics, intelligence test scores, reading readiness test performance, retentions in grade, and replies to those items that they did answer. Preliminary analysis indicated that Ss eliminated because of omission of questions had significantly lower first grade IQ and reading-readiness scores, but were not different from the factor analysis Ss in replies on items that were answered. The samples used in the factor analyses were therefore not entirely representative

of the total sample. The first grade mean IQ score for both factor analysis samples was 101 with a standard deviation of 14; the mean Lee-Clark reading readiness score for boys = 1.1, SD = 0.54, and for girls, M = 1.2, SD = 0.53.

Instruments

Ss were asked all 30 items of the TASC as used by Sarason et al. (1960, Appendix B), with the exception of minor revisions in the wording of nine items, and two new items without specific anxiety content.[2] These latter items were:

31R. When you are at home do you think about your school work?

32R. Do you sometimes dream at night about school?

Scale Administration

The TASC was administered orally in the classrooms by 12 female members of the research staff.[3] They were introduced to the children in a standard, neutral manner by the teacher, who then left the room. The children each received answer sheets with the question numbers and the words "Yes" and "No" next to each number. The examiner emphasized that no one but her would see the answers, that there were no right or wrong answers, and that children think and feel differently about the questions. The Ss were told that their task was to listen to each question and then to circle either Yes or No. The TASC was then administered and questions were repeated when requested.

Analysis of the Data

Since one of the crucial issues in past research has been the difference in the level and correlates of the TASC for boys and girls, the factor analyses were done separately for the two sexes. Replies to

the TASC questions were scored 1 for No and 2 for Yes, and a matrix of Pearson product-moment correlations was computed[4] for each sex. The use of dichotomized scores in these correlations acts to restrict the size of the obtained correlations. The correlations for the 30 TASC items and the two other school-related items that were asked of all children are presented in Appendix Table A.

Principal component factor analyses were computed from the correlation matrices. The squared multiple correlation of each variable with all other variables was used as an estimate of communality. Extraction of factors via the principal component solution was continued until all factors were extracted. This solution results in the successive extraction of orthogonal factors that maximize the amount of variance accounted for by each successive factor. The communality estimate is the lower bound of the true communality and a measure of the predictable common variance among the observed correlations (Harman, 1960). Its use enables the analysis of the minimum number of common factors necessary to account for the observed intercorrelations among scale items.

The obtained communality ($\underline{h}^2$) was then computed for each successive factor extracted, summed across variables, and this sum compared with the sum of the original estimates of communality (the squared multiple correlation). The residual correlations were also examined. For both boys and girls, the sum of the obtained communalities across the first three components just exceeded the sum of the original estimates of communality. (See Appendix Tables B and C.) Thus, three factors appeared to account for the common variance and to be the appropriate number to retain for rotation. However, three considerations suggested that the retention of an additional

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factor for rotation might be appropriate: (1) The retention of "excess" factors for rotation is less likely to affect adversely the interpretation than the underestimation of the number of factors. Thurstone recommends that too many factors are preferable to too few factors in identifying the structure. He proposes that if too many factors are determined in the factor matrix before rotation of the axes, the residual factors appear in the rotation of the axes and are left without interpretation, but if too few factors are rotated, there is likely to be trouble in identifying the structure (Thurstone, 1947, p. 509). Humphreys (1964) has shown that with a very large sample of Ss, adherence to Kaiser's rule of thumb that the number of factors to be rejected equals those with roots less than one (in a principal component analysis with unities in the diagonal) prevented the identification of certain replicable factors. In contrast, the retention of several additional factors resulted in the identification of some additional replicable factors and left some residual uninterpretable factors. (2) The obtained h^2 figure for each variable after four components were extracted was less than the highest correlation of each variable with all other variables in all but one or two instances in either sample. (See Appendix Tables B and C.) Since the highest correlation often has been assumed to be an estimate of communality that is somewhere between the lower and upper bounds of the true communality, it appeared that four components could be retained without going beyond common variances. (3) There was a tendency for our procedures to restrict the size of the correlations and the communality estimates. These restrictions could operate to reduce the number of dimensions that might have been obtained in the factor analysis, the size of the factor loadings, or both.

Because of these considerations, one more factor was retained for rotation than was required to account for the total original estimated variance: four factors were retained for boys and girls.

Each principal component factor matrix was then independently rotated by use of Kaiser's normalized varimax solution for orthogonal rotation. This rotation procedure maximizes the variance of the squared loadings on each factor, thereby yielding factors with high loadings for a few variables and near zero loadings for the remainder. In each sample, the rotation yielded four interpretable factors.

Results

Second Grade Boys and Girls

The rotated factor matrices for boys and girls are presented in Tables 1 and 2 respectively. Inspection of the two matrices resulted in the use of the same factor labels for both sexes: Factor 1 = Test Anxiety; Factor 2 = Remote School Concern; Boys' Factor 3 and Girls' Factor 4 = Poor Self-Evaluation; Boys' Factor 4 and Girls' Factor 3 = Somatic Signs of Anxiety.

Tables 1 and 2 about here

Relationships between rotated factors within the same matrix and across the two factor matrices were then estimated by use of the coefficient of factor similarity (Barlow & Burt, 1954). This index is analagous to a correlation in that it varies between minus one and plus one. The index mainly reflects similarity in patterns of factor loadings and is generally high when all pairs of factor saturations have the same sign. It is an estimate of the proportionality in the two sets of factor loadings.

The sampling distribution of the statistic is unknown, and therefore no test of statistical significance is available. These estimates are presented in Table 3.

Table 3 about here

Examination of the entire cross-sex matrix of coefficients of factor similarity (see the upper right quadrant of Table 3) indicated that the four pairs of commonly labeled factors for boys and girls were quite similar. In each instance the factors identified with common labels yielded indices of factor similarity of .98 or .99. In contrast, the similarity coefficients for the remaining pairs of nonmatched factors were between .36 and .74.

Factor 1 in both instances was labeled the Test Anxiety factor. The coefficient of similarity between the sexes was the highest on this factor, and similar proportions of the common variance were accounted for in boys (40%) and girls (39%). In both samples this factor accounted for more common variance than any other factor. The ten items that loaded most highly on Factor 1 for boys and girls included all but four of the twelve items that specifically mentioned the word, "test." Also among the top ten items were two items dealing with anticipated recitation anxiety (items 15 and 12). The items with highest loadings that illustrate the defining characteristic of this factor are:

25. When the teacher says that she is going to give the class a test, do you become afraid that you will do poor work?

20. Do you worry a lot <u>before</u> you take a test?

19. Are you afraid of tests in school?

29. While you are taking a test do you usually think you are doing poor work?

Factor 2 for both boys and girls was entitled Remote School Concern. It was the smallest factor in both groups, although it accounted for somewhat more common variance for the boys (18%) than for the girls (14%). The eleven items with the highest loadings on Factor 2 included all five items that dealt with dreams and four of the six items that dealt with concerns about school as experienced at home. This factor was labeled remote school concern rather than anxiety because of the high loading of the two affectively neutral questions (31R and 32R) which were added to the scale to tap whether the child reported any dreams or thoughts about school while at home. Illustrative of this factor are the following items with highest loading for both boys and girls:

8. When you are in bed at night, do you sometimes worry about how you are going to do in class the next day?

31R. When you are at home, do you think about your school work?

32R. Do you sometimes dream at night about school?

18. Do you sometimes dream at night that the teacher is angry because you do not know your work?

Factor 3 for boys was most comparable to Factor 4 for girls. This factor could be described as Poor Self-Evaluation for both groups. The highest factor loadings were on items dealing with comparisons with other children. This factor accounted for 21% of the common variance for boys and 20% for girls. Only items 10, 7, and 4 were both uniquely and very highly loaded on this factor for boys and girls. The remaining items with fairly high loadings also loaded on either Factors 1 or 2, which indicates that the feelings of self-doubt reflected by these items were experienced both in the home and in the school testing situation. The key

marker-items on this factor for both boys and girls were:

10. When the teacher is teaching you about reading, do you feel that other children in the class understand her better than you?

7. When the teacher is teaching you about arithmetic, do you feel that other children in the class understand her better than you?

14. Do you sometimes dream at night that other boys and girls in your class do things you cannot do? (Factor 2 also)

4. When the teacher says that she is going to call upon some boys and girls to answer arithmetic problems out loud, do you hope that she will call upon someone else and not upon you?

In the rotation solutions, the fourth factor for boys and the third factor for girls had negative loadings on all but one item. All loadings on these factors for boys and girls were reflected for ease in interpretation (Thurstone, 1947, p. 96). This dimension could then be labeled Somatic Signs of Anxiety. The coefficient of factor similarity was once again very high, although inspection of the loading of items on the two factors showed some differentiation for boys and girls. This factor accounted for 26% of the common variance for girls and 20% for boys. While all five items that dealt with clearly somatic aspects of anxiety, such as the hand shaking, heart beating faster, and stomach upset, were highly loaded on this factor for both sexes, expectations of poor performance were also involved in this dimension. The comparable defining items for boys and girls were:

24. When you are taking a test, does the hand you write with shake a little?

9. When the teacher asks you to write on the blackboard in front of the class, does the hand you write with, sometimes shake a little?

16. When the teacher says that she is going to find out how much you have learned, do you get a funny feeling in your stomach?

28. When the teacher says that she is going to give the class a test, do you get a nervous or funny feeling? (Factor 1 also)

The secondary aspects of the factor for boys and girls seemed to include somewhat different aspects of the TASC. For boys, item 26, which related to performance decrement symptoms that occur concurrently with classroom evaluation, had a relatively high loading. For girls, the secondary aspects of the factor (reflected in items 27, 20, and 13) seemed to deal with more vague and varied worries about one's performance. These items also appeared on other factors.

There appeared to be moderate positive relationships among the factors within each sex, although it is not possible to test whether the indices of factor similarity are significantly different from zero. These relationships can be seen in Table 3, in the upper left quadrant for boys, and the lower right quadrant for girls. Factor 1 was somewhat more of a general factor than the others; it had relatively higher similarity coefficients than any of the other factors. The rotation solutions do not appear to yield complete orthogonal simple structure as estimated by the index of factor similarity. However, the plots of the factor loadings did indicate that the rotation solutions approximated simple structure sufficiently to warrant the use of the orthogonal reference frames.

Second Graders versus Older Children

The second grade factor structures were also compared with those reported by Dunn (1963, 1965). His Ss were described as follows:

Groups 1 and 2 were 223 boys and 191 girls, respectively, drawn from the fourth and fifth grades of an upper middle-class public school system. The average age ... was nine years, 11 months. Groups 3 and 4 were 226 boys and 226 girls, respectively ... from the seventh and ninth grades .... The average age ... was 13 years, 4 months .... (Dunn, 1965, p. 187). He used a slightly modified form of the TASC, omitted item 10 of the original scale, and replaced the Yes-No answer format with four-point response scales (e.g., often, sometimes, once-in-a-while, never).[5] The data were analyzed by a comparable method, namely Hotelling's principal-axes procedure with the squared multiple correlation as a diagonal entry, extraction of 100% of the common variance, and a normalized varimax rotation.

Six or seven factors were required to account for all the common variance in each of Dunn's samples. Only four factors were interpreted, and the present comparisons were limited to these factors. Coefficients of factor similarity were computed for all pairs of factors from the six rotated matrices (one matrix for each sex at three grade levels). The coefficients of factor similarity across samples and those within each sample are presented in Table 4.

Table 4 about here

Only 29 of our 32 items (omitting items 10, 31R, and 32R) were comparable to items included in Dunn's study. The effects of using only these items as the basis for comparison should be noted before the coefficients across age groupings are reported. All similarity coefficients within the two second grade samples based on 29 items (Table 4) were higher

than those based on 32 items (Table 3). Deleting three items that had been used in the factor analyses decreased the orthogonality of the rotation solution within both the sexes. The largest increase for both sexes was in the Remote School Concern versus Poor Self-Evaluation coefficient: the index increased from .47 to .60 for boys and from .35 to .50 for girls.

In the comparisons between second grade boys and girls, the coefficients for the matched factors remained essentially unchanged when only 29 items were used. There were sizable increases in some of the coefficients for the nonmatched factors, but none of the coefficients for nonmatched factors approached the size of those for matched factors. The largest increase in overlap was between the Remote School Concern factor for girls (Factor 2) and the Poor Self-Evaluation factor for boys (Factor 3). Factor 2 for girls also showed a large increase in its similarity coefficient with the Test Anxiety factor for boys (Factor 1).

The omission of items 10, 31R, and 32R clearly interfered with the differentiation between the Remote School Concern and Poor Self-Evaluation factors in both second grade samples. Comparisons of these factors with factors based on data from other samples should therefore be less conclusive than similar comparisons with the second graders' Test Anxiety or Somatic Signs of Anxiety factors. These constraints should be kept in mind in the following comparisons of factor structures across age levels.

Factor 1 was labeled Test Anxiety in both studies. This was the most stable factor in Dunn's data, and it was highly comparable (coefficients of factor similarity between .92 and .96) for our younger and his older age groups. The lowest similarity coefficient was between the

second grade girls and the seventh-ninth grade girls. All off-diagonal coefficients were appreciably below the matched factor coefficients.

Dunn's "Dream Anxiety" factor showed high comparability (coefficients from .91 to .96) across his four samples. This was Factor 2 in all his groups except the seventh-ninth grade boys, where it was Factor 3. It seemed most comparable to the Remote School Concern factor for second graders. However, this comparison was especially handicapped because two of the highest loading items (31R and 32R) on the second grade factor were not contained in Dunn's study. Despite this, the highest index of similarity for the Remote School Concern factor for boys and girls was always with Dunn's Dream Anxiety factor. The converse was not true, however. Dunn's Dream Anxiety factor was most highly similar to the Poor Self-Evaluation factor in three of the four comparisons with second grade girls and in one of the comparisons with second grade boys.

Dunn's "Self-Doubt" factor was only moderately stable in his two age groups. Absent in the sample of fourth-fifth grade girls, its similarity coefficient in the other three samples ranged between .80 and .92. The second graders' Poor Self-Evaluation factor (Factor 3 for boys and Factor 4 for girls) appeared to be its match. Once again, though, the lack of total overlap of items in the two studies was important; item 10, with a very high loading on the Poor Self-Evaluation factor, was not used in Dunn's study. There was only moderately good matching between the three relevant older groups and the second grade samples. The Poor Self-Evaluation factor for second grade boys showed highest similarity (indices between .82 and .85) with the Self-Doubt factor in all three relevant older samples, and vice versa. For second grade girls, mutually

high coefficients occurred with the Self-Doubt factor for seventh-ninth grade boys and girls, but in the comparison with fourth-fifth grade boys, the factor loadings on Poor Self-Evaluation were most similar to those on Dream Anxiety.

Both studies yielded factors that had high loadings on items dealing with physiological or somatic reactions to anxiety. These factors were called Somatic Signs of Anxiety for second graders, while Dunn labeled them "Recitation Anxiety with Somatic Involvement." This was Factor 4 for both his boys' samples, Factor 3 for his fourth-fifth grade girls, and Factor 2 for his seventh-ninth grade girls. This factor in fourth-fifth grade boys was least similar to the other groups in Dunn's study. He proposed that for fourth-fifth grade boys, this factor mainly concerned awareness of physiological involvement, whereas for his other groups, the physiological involvement was concomitant with anticipated recitation anxiety. The similarity between these factors and the second graders' Somatic Signs of Anxiety factor was mutually highest for all but the fourth-fifth grade boys. While the fourth-fifth grade boys' factor of Recitation Anxiety with Somatic Involvement had its highest similarity coefficient with the second graders' Somatic Signs of Anxiety factor, the converse was not true; Somatic Signs of Anxiety for both second grade boys and girls was most similar to the Test Anxiety factor for fourth-fifth grade boys.

Because of differences in the number of factors retained for rotation in the different samples, only general comparisons could be made of the variance accounted for by similar factors at different age levels. The Test Anxiety factor was largest in all samples. It accounted for similar

proportions of the common variance in all groups except one, fourth-fifth grade boys, where a higher proportion of variance was obtained. The Dream Anxiety factor accounted for the second largest proportion of the common variance in the four older samples; in contrast, the similarly structured Remote School Concern factor was the smallest one of the second grade factors. The second largest factor for second graders was Somatic Signs of Anxiety; in the older groups the comparable factor was generally one of the smallest interpreted factors.

Discussion

There are two main conclusions to be drawn from these data. (1) The multidimensional structure of the TASC, as determined by factor analytic techniques, is similar across sexes during primary school years, upper elementary school years, and junior high school years. (2) The multidimensional structure of the TASC is similar across the above age groups.

There is a marked similarity in the factor structure for boys and girls at all age levels. The Test Anxiety factor was consistently the largest one for both sexes and the most stable across sex. These findings are especially interesting in view of repeated past findings that girls have higher total scores on the TASC (Cox, 1962; Sarason et al., 1960). There has also been some evidence in the literature that the TASC is a better predictor of school performance for boys than for girls (Sarason et al., 1960), although this result is not as consistent as that for sex differences in TASC scores. The present results suggest that despite these differences, boys' and girls' reports of anxiety responses to school testing situations can be described along essentially

similar dimensions. However, inspection of the item differences in the second grade data suggested that sex differences in level of anxiety were not uniform across the several dimensions of the TASC. As an initial check on this observation, the percentage of anxiety responses to each item was compared for boys and girls. Considering only those items with high and unique loadings on each of the four factors, it was found that girls reported more anxiety on items uniquely defining the Test Anxiety, Remote School Concern, or Somatic Signs of Anxiety factors, but not on items uniquely defining the Poor Self-Evaluation factor.

The similarity across sex was strongest for second graders, weakest for fourth-fifth graders and intermediate for seventh-ninth graders; thus, there is no indication of a clear developmental trend toward greater or lesser cross-sex similarity. The differences that did occur in the factor structures for boys and girls varied in the three age groupings, with one exception. A consistent sex difference appeared for the factor on which somatic reactions had high loadings. This factor accounted for more common variance for girls than for boys at each age level. This result appears consistent with the suggestion that sex differences in total TASC scores are related to the greater cultural constraints on boys than girls against expressing weakness (Sarason et al., 1960). Such expectations would appear to apply most strongly to the male expression of bodily weakness. The greater relevance of bodily reactions for understanding the factor structure of anxiety in girls is also consistent with findings for adults of the greater frequency of psychophysiologic, hypochondriacal, and hysterical symptomatology in women (Leighton, 1956; Welsh & Dahlstrom, 1956).

Similarity across age groupings is also marked, being clearest for the Test Anxiety factors and poorest for the Dream Anxiety versus Remote School Concern factors. The fourth-fifth grade boys are somewhat divergent from all other groups. In considering his data from two age groupings, Dunn interpreted the differences in his younger male sample as possibly indicative of developmental trends. He suggested that since fourth-fifth grade boys are less mature than girls of the same ages, the boys exhibited less cognitive differentiation in responding to the TASC. However, when the second grade age group was included in the comparison, no clear developmental trend emerged. The similarity between the factor structures and variance allocations of the youngest and oldest subjects in these three age groupings raises some doubts about the original cognitive differentiation interpretation.

It is by now a reliable finding that factor analysis yields a stable multidimensional structure for the TASC. This has been demonstrated with the fairly heterogeneous group of second grade public school pupils in this report, somewhat more homogeneous samples of fourth, fifth, seventh, and ninth graders in an upper middle class public school system (Dunn, 1965) and a sample of institutionalized mentally retarded children (Silverstein & Mohan, 1964). But what are the implications of this result for theoretical conceptions of anxiety and for predictions of behavior using the TASC? The development of the TASC was premised on the importance of delimiting the stimulus component of anxiety to academic evaluation situations in school, while admitting the full range of anxiety reactions. The questions comprising the TASC were designed so that each included references to: (a) tests or a variety of test-like situations that occur in school settings; (b) the experience of unpleasant reactions; and (c)

anticipated danger or painful consequences. Finding that the TASC has a multidimensionsl structure does not in itself determine whether or not the scale measures a common realm of situations eliciting anxiety defined by school tests or test-like situations. The answer to that question would require factor analyses of anxiety items that included comparisons to other possible kinds of anxiety-arousing situations, e.g., evaluative situations occurring outside of school, affiliative situations in school, aggressive situations, anticipation of physical danger. The results do imply that even within the realm of anxiety reactions to tests and other evaluation situations in school, several meaningful independent dimensions are required for a parsimonious description of these reactions.

The nature of these dimensions can usefully be related to Endler, Hunt, & Rosenstein's (1962) argument for defining both the stimulus and response components of anxiety. The four dimensions isolated in the second grade data indicate (a) that even the stimulus class included in the TASC needs to be further delimited by distinguishing between formal test situations and other school evaluation situations, and (b) that there is more than one mode of anxiety response to school evaluation situations. The Test Anxiety factor clearly seems to define one distinctive kind of school evaluation situation that can elicit a variety of anxiety responses. The Somatic Signs of Anxiety factor is clearly a specification of a response mode that occurs to more than one kind of school situation--tests, recitation. The other two factors are not as simply conceptualized in these terms. The Poor Self-Evaluation factor can be thought of as defined by both a class of stimuli--comparisons with other children concerning school performance--and a class of responses--self-derogations. While the highest loading items on that factor concerned negative self-other comparisons, there were

additional items with moderate loadings that did not concern comparative situations but that also involved negative evaluation of one's competency. The Remote School Concern factor can be considered to specify another type of response--ruminating or dreaming about anxiety-arousing school situations while removed from the situation--but it is not entirely clear that this dimension defines a response mode that is distinctively tied to the anxiety class.

In order to determine whether the apparent dimensions of the modes of anxiety responses isolated in the TASC factor analyses generalize across broad classes of anxiety-arousing situations, it would be desirable to determine whether similar dimensions best describe anxiety experienced in other situations. If we take affiliative situations as an example, similar dimensions might consist of: anxiety reactions that occur remote from the potential rejection situation, reflected in dreaming about not being asked to a party, or worrying about not being told a secret; self-derogation about one's attractiveness to others; and somatic anxiety reactions to anticipated rejection. A further step toward understanding the nature of both the stimulus and response components of anxiety would be to include the measures of anxiety reactions to test or test-like situations and affiliative situations in a single factor analysis. For example, if somatic reactions to testing and affiliative situations load on the same dimension, this would imply that the anxiety response mode of somatic reactions is independent of these situations; if reports of somatic anxiety reactions to affiliative situations load on a different dimension from reports of anxiety reactions to school testing situations, this would indicate an interaction between situation and response mode. Ultimately, broad sampling from the full matrix of stimuli and responses tied to anxiety would be desirable in

order to define the independent and interactive effects of stimuli, response modes, and individual differences upon anxiety.

The implications of the multidimensional structure of the TASC for the prediction of behavior are also complex. Past research has demonstrated negative relationships between total TASC scores and school achievement measures (Ruebush, 1963). In a later stage of this research program, it will be possible to determine whether this type of relationship is a function of only some of the dimensions underlying responses to the TASC. The most obvious possibility is that the Test Anxiety dimensions might be the best predictor of school test performances. Since this was the largest dimension in all subgroups, high scores on this dimension might account for the overall relationships previously found. Alternatively, a particular profile of scores on the several dimensions might be the best predictor of school test performance, and more generally, different profiles of scores on the dimensions of the TASC might predict different kinds of behavior or behavior in different kinds of situations. When the results of empirical explorations of these issues are available, it might then be fruitful to consider expanding the TASC so that the several reliably identified and predictively useful dimensions have adequate item coverage.

References

Barlow, J. A., & Burt, C. The identification of factors from different experiments. British Journal of Statistical Psychology, 1954, 7, 52-56.

Cox, F. N. Educational streaming and general and test anxiety. Child Development, 1962, 33, 381-390.

Dunn, J. A. Age and sex differences in the factor structure of the test anxiety scale. Paper read at Midwestern Psychological Association, Chicago, May, 1963.

Dunn, J. A. Factor structure of the test anxiety scale for children. Journal of Consulting Psychology, 1964, 28, 92.

Dunn, J. A. Stability of the factor structure of the test anxiety scale for children across age and sex groups. Journal of Consulting Psychology, 1965, 29, 187.

Endler, N. S., Hunt, J. McV., & Rosenstein, A. J. An S-R inventory of anxiousness. Psychological Monographs: General and Applied, 1962, 76, No. 17 (whole No. 536).

Harman, H. H. Modern factor analysis. Chicago: University of Chicago Press, 1960.

Humphreys, L. G. Number of cases and number of factors: an example where N is very large. Educational and Psychological Measurement, 1964, 24, 457-466.

Leighton, Dorothea C. The distribution of psychiatric symptoms in a small town. American Journal of Psychiatry, 1956, 112, 716-723.

Ruebush, B. K. Anxiety. In H. W. Stevenson (Ed.) Child psychology. Yearbook of the National Society for the Study of Education, 1963, 62, Part I. Pp. 460-516.

Sarason, S. B., Davidson, K. S., Lighthall, F. F., Waite, R. R., & Ruebush, B. K. Anxiety in elementary school children. New York: John Wiley, 1960.

Sarason, S. B., Hill, K. T., & Zimbardo, P. G. A longitudinal study of the relation of test anxiety to performance on intelligence and achievement tests. Monographs of the Society for Research in Child Development, 1964, 29, No. 7 (whole No. 98).

Silverstein, A. B., & Mohan, P. J. Test anxiety or generalized school anxiety? American Journal of Mental Deficiency, 1964, 69, 438-439.

Thurstone, L. L. Multiple factor analysis. Chicago: University of Chicago Press, 1947.

Welsh, G. S., & Dahlstrom, W. G. (Eds.) Basic readings on the MMPI in psychology and medicine. Minneapolis: University of Minnesota Press, 1956.

Footnotes

[1]This paper is an extended report of a paper with the same title that will appear in the Journal of Consulting Psychology, 1967, 31.

This study is part of a larger project entitled, Response Set, Test Structure, and Demographic Correlates of Test Anxiety and Defensiveness in an Elementary School Population. The help of our dedicated project clerks, Mrs. Niel Solomon and Mrs. Jesse Stern, and our research assistants, Mr. Galen Alessi, Miss Youngja Kim, Mr. Abbas Mirrashidi, and Mr. Stephen Shevitz is gratefully acknowledged. We are indebted to many of our colleagues at the Mental Health Study Center for their help throughout this project, and especially to Dr. Dee N. Lloyd for his comments on an earlier draft of this paper. We also wish to thank the school officials, children, and parents who so generously participated in this project.

[2]The 24-item Defensiveness Scale for Children (DSC) was also administered to all Ss (Sarason, Hill, & Zimbardo, 1964, Appendix A). Additional new items were interspersed among the TASC and DSC for the purposes of studying response set and defensiveness about positive feelings. The deletion of tested Ss from the factor analyses samples was based on the number of questions omitted from these expanded versions of both the TASC and DSC. More complete descriptions of the methodology are available from the authors upon request for Working Paper #3.

[3]We wish to express appreciation to our colleagues who assisted us: Mary Lou Bauer, Eleanor Fay, Anita Green, Sandra Hansen, Julie Kisielewski, Janet Moran, Gretchen Schafft, Julianna Schamp, Esther Solomon, and Elizabeth Unger.

[4]All computations were done on the Honeywell 800 computer at the

Computation and Data Processing Branch of the National Institutes of Health, under the supervision of Miss Gayle Hueston, whose assistance is gratefully acknowledged.

[5]The wording of most questions was changed slightly from that used by Sarason et al. (1960). These changes appeared to be of three main types. (1) Modifiers, such as "sometimes," were deleted, since the response categories now included frequency choices. (2) References to the specific school subjects of reading or arithmetic were deleted, and general references were substituted. (3) Phrasing was made more appropriate to older students, e.g., the word, pupil, was substituted for "boys and girls." These changes appear to the present authors to be minor and unrelated to any differences in results from the two studies, but the existence of such "minor" differences in supposedly comparable factor analytic studies is a chronic source of uncertainty in interpretation.

Table 1
TASC: Varimax Rotated Factor Matrix
Boys (N = 3833[a])

TASC question	#	Factor loading 1 Test anxiety	2 Remote school concern	3 Poor self eval.	4[b] Somatic signs anxiety	h^2
worry teacher ask Qs	1	18	04	26	22	15
worry promoted	2	16	10	21	18	11
read aloud afraid mistakes	3	28	01	25	17	17
arith hope call someone else	4	10	-06	30	08	11
dream cannot answer Qs	5	07	19	21	11	09
teacher much learned heart beat	6	15	14	13	30	15
arith other children better	7	10	-03	48	09	24
bed worry how do next day	8	19	41	14	11	23
blackboard hand shake	9	06	04	11	47	24
reading other children better	10	12	05	50	-01	27
worry more other children	11	17	24	09	17	12
home arith afraid answer wrong	12	37	05	27	22	26
sick worry behind other children	13	14	26	17	17	14
dream others can do things	14	13	19	34	08	18
home reading worry poor work	15	37	12	26	07	22
teacher much learned stomach	16	20	16	05	42	25
did poorly feel like crying	17	28	06	08	23	14
dream teacher angry not know work	18	25	31	23	10	22
afraid tests	19	48	-01	10	05	25
worry before test	20	54	14	17	16	37
worry while test	21	43	08	15	25	28
after test worry	22	26	31	12	13	20
dream poor work test had that day	23	39	30	18	05	28
test, hand shake	24	12	14	10	50	30
going test, afraid do poor	25	63	08	15	11	44
hard test forget things knew	26	26	16	19	22	18
wish didn't worry tests	27	18	18	-01	14	09
going test, nervous feeling	28	44	14	07	35	34
while test think doing poor	29	46	08	15	14	26
way to school worry may give test	30	32	27	18	17	24
home, think about school work	31R	-04	37	-07	09	15
sometimes dream about school	32R	-02	37	-07	00	14
Sum of squares		2.73	1.22	1.43	1.43	6.84
% common variance		39.95	17.89	20.89	20.92	99.65

Note.--Decimal points omitted. All loadings are positive unless noted otherwise. Table values are rounded to 2 decimals; computer calculations carried to 6 decimals.

[a]This is the lowest N used; maximum N = 3867. Due to missing data, actual N varies slightly.

[b]Reflected.

Table 2
TASC: Varimax Rotated Factor Matrix
Girls (N = 3660[a])

TASC question	#	Factor loading 1 Test anxiety	2 Remote school concern	3[b] Somatic signs anxiety	4 Poor self eval.	h^2
worry teacher ask Qs	1	28	-01	21	20	17
worry promoted	2	22	08	22	10	11
read aloud afraid mistakes	3	30	-01	20	20	16
arith hope call someone else	4	12	-12	06	32	13
dream cannot answer Qs	5	12	19	11	26	13
teacher much learned heart beat	6	16	07	35	12	17
arith other children better	7	11	-09	08	46	23
bed worry how do next day	8	21	38	20	07	24
blackboard hand shake	9	06	12	43	06	21
reading other children better	10	11	-00	04	49	25
worry more other children	11	17	18	17	15	11
home arith afraid answer wrong	12	39	02	21	29	28
sick worry behind other children	13	19	20	21	17	15
dream others can do things	14	17	21	14	35	22
home reading worry poor work	15	40	07	03	31	26
teacher much learned stomach	16	16	14	46	09	27
did poorly feel like crying	17	23	03	37	10	20
dream teacher angry not know work	18	28	29	08	28	25
afraid tests	19	47	-05	15	10	25
worry <u>before</u> test	20	54	07	24	09	36
worry <u>while</u> test	21	39	02	34	09	27
<u>after</u> test worry	22	30	26	19	08	20
dream poor work test had that day	23	45	28	10	21	33
test, hand shake	24	11	14	53	06	31
going test, afraid do poor	25	61	04	16	17	44
hard test forget things knew	26	30	14	18	19	18
wish didn't worry tests	27	12	14	24	01	09
going test, nervous feeling	28	38	12	38	09	32
while test think doing poor	29	41	05	19	22	26
way to school worry may give test	30	37	28	16	17	26
home, think about school work	31R	-01	30	10	-06	10
sometimes dream about school	32R	-08	34	04	-12	14
Sum of squares		2.80	1.00	1.85	1.42	7.07
% common variance		39.63	13.67	26.15	20.02	99.58

Note.--Decimal points omitted. All loadings are positive unless noted otherwise. Table values are rounded to 2 decimals; computer calculations carried to 6 decimals.

[a]This is the lowest N used; maximum N = 3684. Due to missing data, actual N varies slightly.

[b]Reflected.

Table 3

Coefficients of Factor Similarity for TASC Rotated Factor Matrices from Second Graders

Factor		Boys (N=3833)[a]				Girls (N=3660)[a]			
		1	2	3	4[b]	1	2	4	3[b]
Boys									
Test	1		57	68	68	99	48	68	74
Remote	2			46	58	60	98	44	62
Self-Eval.	3				56	73	36	98	57
Somatic	4[b]					67	53	53	98
Girls									
Test	1						50	72	72
Remote	2							35	56
Self-Eval.	4								53
Somatic	3[b]								

Note.--All values are positive; all decimal points omitted. Entries are based on 32 items.

[a]These are the lowest Ns used; maximum Ns = 3867 for boys and 3684 for girls. Due to missing data, actual Ns vary slightly.

[b]Factor loadings reflected.

Table 4
Coefficients of Factor Similarity for TASC Rotated Factor Matrices Across Age Levels

Factor		Boys: 2nd (N=3833)				Girls: 2nd (N=3660)				Boys: 4th-5th (N=223)				Girls: 4th-5th (N=191)				Boys: 7th,9th (N=226)				Girls: 7th,9th (N=226)			
		1	2	3	4[a]	1	2	4	3[a]	1	2	3	4	1	2	4	3	1	2	3	4	1	3	4	2
Boys: 2nd																									
Test	1		67	72	68	99	55	71	74	96	72	55	64	94	71	71	71	94	64	66	62	93	62	72	71
Remote	2			60	63	70	97	59	67	74	82	33	64	64	84	57	65	67	75	39	49	67	84	52	65
Self-eval.	3				63	77	50	97	63	73	78	82	63	73	82	75	74	72	76	85	67	68	72	84	67
Somatic	4[a]					68	58	59	98	77	66	62	72	74	64	61	81	72	63	62	92	75	61	61	89
Girls: 2nd																									
Test	1	99	70	77	68		59	76	72	95	76	59	64	93	75	74	72	94	68	69	62	92	67	75	70
Remote	2	55	97	50	58			50	60	63	79	22	54	51	81	48	54	54	74	26	42	54	83	39	58
Self-eval.	4	71	59	97	59				58	71	81	78	64	70	84	73	72	68	79	82	64	64	75	82	65
Somatic	3[a]	74	67	63	98					82	69	60	76	81	65	63	82	79	63	61	88	81	61	62	90
Boys: 4th-5th																									
Test	1	96	74	73	77	95	63	71	82		72	57	67	96	73	70	74	98	66	65	66	97	64	70	74
Dream	2	72	82	78	66	76	79	81	69			49	64	67	94	63	69	65	95	56	64	63	95	61	71
Self-doubt	3	55	33	82	62	59	22	78	60				52	65	55	64	71	59	46	92	72	56	42	80	64
Recit. somatic	4	64	64	63	72	64	54	64	76					69	62	59	84	67	57	54	74	67	55	73	85
Girls: 4th-5th																									
Test	1	94	64	73	74	93	51	70	81	96	67	65	69		67	67	76	97	59	70	68	97	57	73	74
Dream	2	71	84	82	64	75	81	84	65	73	94	55	62			64	69	66	91	61	60	64	96	66	67
General	4	71	57	75	61	74	48	73	63	70	63	64	59				64	68	60	73	54	66	56	81	60
Recit. somatic	3	71	65	74	81	72	54	72	82	74	69	71	84					74	63	78	84	73	57	78	93
Boys: 7th,9th																									
Test	1	94	67	72	72	94	54	68	79	98	65	59	67	97	66	68	74		57	66	64	99	55	70	72
Dream	2	64	75	76	63	68	74	79	63	66	95	46	57	59	91	60	63			52	58	56	92	61	64
Self-doubt	3	66	39	85	62	69	26	82	61	65	56	92	54	70	61	73	78				68	64	46	84	69
Recit. somatic	4	62	49	67	92	62	42	64	88	66	64	72	74	68	60	54	84					64	56	63	90
Girls: 7th,9th																									
Test	1	93	67	68	75	92	54	64	81	97	63	56	67	97	64	66	73	99	56	64	64		55	67	72
Dream	3	62	84	72	61	67	83	75	61	64	95	42	55	57	96	56	57	55	92	46	56			52	60
Self-doubt	4	72	52	84	61	75	39	82	62	70	61	80	73	73	66	81	78	70	61	84	63				72
Recit. somatic	2	71	65	67	89	70	58	65	91	74	71	64	85	74	67	60	93	72	64	69	90				

Note.--All values are positive; all decimal points omitted. Entries are based on 29 items. Data for 4th-5th and 7th,9th graders from Dunn (1963).

[a]Factor loadings reflected.

APPENDIX

TABLES

Appendix

Table A

TASC: Correlation Matrix
Total Sample: Boys (N = 3833*) and Girls (N = 3660*)

	Girls ↓ / Boys →	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31R	32R
worry teacher ask Qs	1		213	211	125	115	144	148	150	112	112	143	198	108	105	139	161	127	141	104	198	179	140	089	111	155	128	066	161	141	179	-011	-029
worry promoted	2	242		164	079	086	130	131	153	102	084	168	161	148	086	131	112	127	106	083	170	182	168	114	096	140	120	065	134	114	175	040	-045
read aloud afraid	3	230	161		049	076	145	167	132	132	153	098	266	152	112	176	122	148	122	163	225	212	110	155	100	248	179	078	172	187	153	013	-023
arith call someone else	4	115	021	018		117	086	133	066	039	154	081	140	076	117	091	091	054	093	109	104	101	054	061	069	110	069	-006	048	093	123	-047	-145
dream cannot answer Qs	5	114	072	098	152		102	070	144	093	119	078	091	093	134	085	093	088	171	063	092	126	082	169	101	090	109	042	128	087	146	054	061
teacher much learned heart beat	6	181	169	149	083	124		037	150	157	123	117	143	163	112	141	274	127	166	107	174	136	133	128	152	161	132	086	234	103	151	030	034
arith other children better	7	142	094	150	134	072	030		005	128	359	085	204	096	179	132	081	105	114	093	167	145	104	108	103	132	128	018	111	150	099	004	000
bad worry next day	8	146	182	121	056	167	180	-068		031	128	211	151	206	169	152	173	124	193	110	207	169	232	199	142	177	170	118	175	145	211	161	105
blackboard hand shake	9	097	095	149	048	116	152	070	071		042	100	184	105	116	116	193	112	108	079	129	135	085	121	380	129	172	075	190	124	109	068	040
reading other children better	10	135	079	135	157	123	121	344	097	-018		-017	143	097	199	204	053	040	150	122	157	127	116	137	091	155	132	065	121	134	151	-014	004
worry more other children	11	140	163	131	109	115	086	128	194	120	013		181	154	097	137	129	107	141	100	167	182	161	131	120	151	109	083	136	126	179	121	062
home arith afraid	12	234	153	257	174	116	192	193	158	169	177	164		129	179	258	184	196	203	189	280	264	180	203	165	327	205	119	241	261	198	026	-001
sick behind other children	13	139	154	141	036	131	146	114	210	100	144	131	121		159	125	165	100	154	083	175	145	187	149	113	165	172	087	174	114	193	093	042
dream others can do things	14	100	092	142	084	165	127	181	185	138	217	122	199	165		192	107	121	209	082	170	131	113	221	147	168	162	063	136	150	117	-006	093
home reading worry	15	188	101	213	169	137	127	159	156	107	194	138	298	145	202		063	162	226	195	265	230	151	248	162	299	173	071	217	261	190	026	021
teacher much learned stomach	16	158	138	113	078	115	276	094	196	183	102	141	192	194	149	047		171	183	118	201	208	163	166	237	190	154	158	331	173	198	069	035
did poorly crying	17	162	176	178	068	091	227	107	153	151	075	129	197	190	127	126	249		087	151	190	211	126	166	181	227	127	098	222	193	154	032	024
dream teacher angry	18	133	111	150	104	222	136	115	191	129	125	150	220	146	260	228	145	100		150	205	180	172	309	161	231	177	112	208	187	243	072	108
afraid tests	19	174	136	179	121	113	136	127	097	085	105	095	243	130	123	233	148	128	158		334	250	140	194	076	338	154	078	256	230	207	-041	-010
worry before test	20	210	177	200	084	126	198	125	200	154	122	163	269	190	187	257	196	214	203	360		320	271	303	177	391	239	162	375	271	273	038	031
worry while test	21	205	163	188	082	094	175	116	166	139	120	147	233	158	149	187	224	204	153	257	308		163	208	247	331	191	169	280	288	238	027	017
after test worry	22	170	198	167	039	101	125	079	253	120	092	169	176	202	135	152	159	179	139	145	270	128		194	140	222	202	166	214	174	240	128	078
dream poor work test	23	145	128	169	091	160	143	115	206	142	123	145	273	187	268	272	188	189	337	217	288	213	224		130	320	209	113	262	260	265	061	104
test, hand shake	24	105	089	117	067	116	174	065	173	388	066	122	148	137	162	109	251	199	141	134	211	278	158	163		137	207	136	264	199	200	098	066
going test, afraid do poor	25	214	161	234	120	131	170	176	158	132	174	134	334	187	172	305	213	239	243	319	399	313	250	380	138		226	138	356	395	283	014	002
hand test forget	26	149	137	146	093	122	124	140	168	124	147	120	201	122	174	163	170	161	192	186	229	180	210	246	170	257		076	273	179	209	042	032
wish didn't worry tests	27	066	090	107	018	055	099	025	115	107	116	063	108	110	103	063	160	151	107	083	135	165	110	123	169	115	089		105	165	086	087	074
going test, nervous	28	170	134	174	105	123	208	107	188	209	099	143	249	186	202	195	332	199	218	275	329	285	216	278	319	352	257	106		234	266	045	024
while test think doing poor	29	150	152	209	083	153	109	170	145	103	164	139	268	166	194	269	187	226	214	194	260	295	146	316	216	398	215	165	187		170	025	043
way to school worry test	30	193	144	141	113	178	162	092	229	133	136	192	215	171	194	225	172	114	256	213	289	257	253	290	186	283	218	094	294	139		096	062
home think school work	31R	011	041	-008	-037	064	013	003	148	085	111	094	033	069	-040	011	081	016	039	-005	028	048	119	057	081	032	040	107	062	035	082		226
dream school	32R	057	-010	-045	-720	-024	017	-022	074	058	-044	005	-035	018	054	-025	062	-009	046	-043	-030	-006	026	063	064	-023	005	062	001	-024	042	194	

Note: Pearson product-moment correlations. Signs are positive unless indicated otherwise. Decimal points are omitted; values truncated at three decimals.

Correlations based on boys are above the diagonal, girls' data are below the diagonal.

* These are the lowest Ns used; maximum Ns = 3867 for boys, and 3684 for girls. Due to missing data, actual Ns vary slightly. Only Ss who did not omit more than 1 question on either the TASC or DSC were included in this analysis.

Appendix

Table B

TASC: Principal Component Factor Matrix

Total Sample Boys (N = 3833*)

TASC Question	#	Component Loading 1	2	3	4	h^2 Obt.	Est**	high r
worry teacher ask Qs	1	347	-070	120	-086	147	144	213
worry promoted	2	317	-010	099	-039	112	125	213
read aloud afraid mistakes	3	384	-138	031	-052	171	165	266
arith wish call someone else	4	208	-194	164	-038	109	102	154
dream cannot answer Qs	5	252	054	153	057	093	085	171
teacher much learned heart beat	6	345	106	064	-117	148	148	274
arith other children better	7	301	-250	303	-010	245	204	359
bed worry how do next day	8	386	211	057	188	232	194	232
blackboard hand shake	9	315	133	113	-328	238	195	380
reading other children better	10	312	-245	306	124	267	215	359
worry more other children	11	320	146	019	036	125	133	211
home arith afraid answer wrong	12	494	-128	008	-058	264	240	327
sick worry behind other children	13	342	120	102	055	145	129	206
dream others can do things	14	346	-032	208	107	175	152	221
home reading worry poor work	15	444	-132	-008	099	224	207	299
teacher much learned stomach	16	408	189	-008	-213	248	218	331
did poorly feel like crying	17	356	005	-080	-101	143	130	227
dream teacher angry not know work	18	430	077	082	160	223	199	309
afraid tests	19	399	-185	-226	035	246	198	338
worry <u>before</u> test	20	576	-084	-170	048	370	325	391
worry <u>while</u> test	21	509	-056	-111	-076	280	252	331
<u>after</u> test worry	22	406	135	-007	119	198	178	271
dream poor work test had that day	23	480	030	-061	201	276	247	320
test, hand shake	24	400	205	090	-294	296	253	380
going test, afraid do poor	25	585	-168	-255	064	440	363	395
hard test forget things knew	26	420	029	033	-026	179	168	273
wish didn't worry tests	27	251	132	-071	006	086	088	169
going test, nervous feeling	28	545	055	-152	-134	342	311	375
while test think doing poor	29	477	-104	-146	017	260	244	355
way to school worry may give test	30	477	075	-002	081	240	225	283
home think about school work	31R	116	350	046	124	153	105	226
dream about school	32R	085	313	019	192	143	108	226
Eigenvalue		4.960	.768	.573	.533			
% total variance		15.501	2.402	1.793	1.667			
Sum of h^2 estimates						6.836	6.066	9.142
% common variance		72.557	11.234	8.382	7.796	99.969		

<u>Note:</u> Decimal points omitted. All loadings are positive unless noted otherwise. Table values truncated at 3 decimals; computer calculations carried to 6 decimals.

*These are the lowest <u>N</u>s used; maximum <u>N</u>s = 3867. Due to missing data, actual <u>N</u>s vary slightly. Only <u>S</u>s who did not omit more than 1 question on either the TASC or DSC were included in this analysis.

**Multiple R^2 of each variable with all other variables.

Appendix

Table C

TASC: Principal Component Factor Matrix

Total Sample Girls (N = 3660*)

TASC Question	#	Component Loading 1	2	3	4	n^2 Obt.	Est.**	high r
worry teacher ask Qs	1	386	-084	-091	029	166	171	242
worry promoted	2	328	049	-038	002	111	137	242
read aloud afraid mistakes	3	387	-089	-081	008	164	168	257
arith wish call someone else	4	218	-243	-051	150	132	137	-220
dream cannot answer Qs	5	298	-018	151	126	128	116	222
teacher much learned heart beat	6	364	117	-114	105	171	165	276
arith other children better	7	284	-299	-000	252	234	204	344
bed worry how do next day	8	385	216	205	-022	238	216	253
blackboard hand shake	9	320	245	-128	165	206	202	388
reading other children better	10	300	-295	097	254	251	206	344
worry more other children	11	319	061	076	045	113	128	194
home arith afraid answer wrong	12	506	-152	-048	006	282	255	334
sick worry behind other children	13	365	073	072	065	148	141	210
dream others can do things	14	394	-063	176	164	217	189	268
home reading worry poor work	15	445	-230	094	-054	263	230	305
teacher much learned stomach	16	424	228	-127	132	266	232	332
did poorly feel like crying	17	398	094	-164	059	198	179	249
dream teacher angry not know work	18	430	-034	243	018	246	212	337
afraid tests	19	432	-128	-122	-183	252	215	360
worry before test	20	557	-023	-087	-208	362	312	399
worry while test	21	485	040	-169	-068	270	246	313
after test worry	22	411	115	103	-083	200	195	270
dream poor work test had that day	23	529	-027	193	-124	333	295	380
test, hand shake	24	411	301	-161	168	314	279	388
going test, afraid do poor	25	596	-150	-048	-232	435	378	398
hard test forget things knew	26	420	-015	042	-011	178	165	257
wish didn't worry tests	27	250	169	-027	014	092	088	169
going test, nervous feeling	28	538	121	-111	-046	319	309	352
while test think doing poor	29	491	-107	-026	-053	256	282	398
way to school worry may give test	30	482	042	151	-076	263	244	294
home think about school work	31R	107	254	172	003	105	092	194
dream about school	32R	008	300	215	-014	136	115	-220
Eigenvalue		5.194	.886	.521	.463			
% total variance		16.234	2.770	1.631	1.448			
Sum of h^2 estimates						7.066	6.519	9.421
% common variance		73.506	12.538	7.373	6.552			

Note: Decimal points omitted. All loadings are positive unless noted otherwise. Table values truncated at 3 decimals; computer calculations carried to 6 decimals.

*These are the lowest Ns used; maximum Ns = 3684. Due to missing data, actual Ns vary slightly. Only Ss who did not omit more than 1 question on either the TASC or DSC were included in this analysis.

**Multiple R^2 of each variable with all other variables.